PATENT APPLICATION
Atty Do. No. 9585-0439

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Yip-Chun HUANG et al.

Application No.: 10/695,327

Filed: October 27, 2003

Confirmation No.: 4865

Examiner: Quang N. VO

Group Art Unit: 2625

For: METHOD FOR REDUCING IMAGE NOISE

Date: January 12, 2012

Mail Stop Appeal Brief - Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

BRIEF OF APPELLANT

This Brief is presented in opposition to the Examiner's rejection of claims 1-4, 6-13, and 18-30 in the Final Office Action mailed August 24, 2011. The fees required under § 41.37(a)(2) and any required petition for extension of time for filing this Brief and fees therefore are dealt with in the NOTICE OF APPEAL FROM THE EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES, which was filed on November 18, 2011.

This Brief contains items under the following headings, and in the order set forth below. Any reference to Appellant's specification is with regards to page and paragraph numbers as provided in the application as-filed. Any reference to the "Response" relates to the amendment and response dated October 14, 2011, unless otherwise specified. Any reference to the "Final Office Action" relates to the Final Office Action dated August 24, 2011, unless otherwise specified.

TABLE OF CONTENTS

I. Real Party in Interest under 37 CFR §41.37(c)(1)(i)

The real party in interest is Transpacific Systems, LLC, a corporation established under the laws of the State of Delaware and having a principal place of business at 2711 Centerville Road, Suite 400, Wilmington, Delaware 19808, U.S.A. (hereinafter "Appellant").

II. Related Appeals and Interferences under 37 CFR § 41.37(c)(1)(ii)

The Board's decision in the present Appeal will not directly affect, be directly affected by, or have any bearing on, any other appeals or interferences known to the Appellant or to the Appellant's legal representative.

III. Status of Claims under 37 CFR § 41.37(c)(1)(iii)

Status of the Claims:

1. Claims presented: 1-30
2. Claims withdrawn from consideration but not cancelled: None
3. Claims cancelled: 5 and 14-17
4. Claims pending: 1-4, 6-13, and 18-30, of which:
    a. claims allowed: NONE
    b. claims rejected: 1-4, 6-13, and 18-30

All the rejected claims, namely claims 1-4, 6-13, and 18-30, are being appealed. The appealed claims are eligible for appeal, having been twice rejected.

IV. Status of Amendments under 37 CFR § 41.37(c)(1)(iv)

The claims were last amended October 19, 2011. The pending claims are reflected in the attached Claims Appendix. None of the pending claims have been amended subsequent to the Final Office Action dated August 24, 2011 or the Advisory Action dated November 4, 2011.

V. Summary of Claimed Subject Matter under 37 CFR § 41.37(c)(1)(v)

The pending application includes claims directed to apparatus and methods for reducing image noise in a scanned image.

The corresponding description in the Appellant's specification that corresponds to the subject matter recited in independent claims 1, 6, 8, and 18 is as follows:

Claim 1

Features recited in claim 1:

i. *A method.*

Description: See, e.g., FIG. 1; paragraphs 0001, 0005, and 0024; and original claims 1-13, which form part of the specification.

ii. *scanning an image with a scanner to obtain a full color level of a color element of a pixel of the scanned image.*

Description: See, e.g., FIG. 1, reference nos. 104 and S102; paragraphs 0005-0020, 0024, and 0025; and original claims 1 and 8, which form part of the specification.

iii. *decreasing the full color level of the color element by reducing a number of bits of the full color level of the color element to form a reduced color level image.*

Description: See, e.g., FIG. 1, reference no. S104, paragraphs 0005-0020 and 0026; and original claims 1, 3, 8, and 9 which form part of the specification.

iv. w*herein the number of bits reduced from the full color level is dependent on an image noise associated with the scanned image.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020 and 0026; and original claims 1, 3, 8, and 9 which form part of the specification.

v. *wherein decreasing the full color level causes the image noise to be substantially removed from the scanned image.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020, 0024, 0026, and 0029; and original claims 1, 3, 8, and 9 which form part of the specification.

vi. *composing a pattern comprising the number of bits reduced from the full color level of the color element.*

Description: See, e.g., FIG. 1, reference no. S106; paragraphs 0005-0020 and 0027; and original claims 1, 3, 8, and 9 which form part of the specification.

vii. *wherein the pattern has less color level of the color element than the full color level.*

Description: See, e.g., FIG. 1, reference no. S106, paragraphs 0005-0020 and 0027; and original claims 1, 3, 8, and 9 which form part of the specification.

viii. *restoring the full color level of the color element of the pixel by combining the reduced color level image with the pattern.*

Description: See, e.g., FIG. 1, reference nos. S108 and S110; paragraphs 0005-0020, 0028, and 0029; and original claims 1, 2, 4-8, and 10-13 which form part of the specification.

ix. *wherein the full color level of the color element is restored without reintroducing the image noise into the scanned image.*

Description: See, e.g., FIG. 1, reference nos. S108 and S110; paragraphs 0005-0020, 0028, and 0029; and original claims 1, 2, 4-8, and 10-13 which form part of the specification.

Claim 6

Features recited in claim 6:

i. *A method.*

Description: See, e.g., FIG. 1; paragraphs 0001, 0005, and 0024; and original claims 1-13, which form part of the specification.

ii. *scanning an image with a scanner to obtain a gray scale of one or more pixels of the image.*

Description: See, e.g., FIG. 1, reference nos. 104, S102, and S106; paragraphs 0005-0020, 0024, and 0025; and original claims 1 and 8, which form part of the specification.

iii. *reducing the gray scale of the one or more pixels of the scanned image by reducing a number of bits of gray scale image data from each of the one or more pixels.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020 and 0026; and original claims 1, 3, 8, and 9 which form part of the specification.

iv. *wherein the number of bits of gray scale image data reduced from the one or more pixels is determined based, at least in part, on an image noise associated with the scanned image.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020 and 0026; and original claims 1, 3, 8, and 9 which form part of the specification.

v. *wherein reducing the gray scale causes the image noise to be substantially removed from the scanned image.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020, 0024, 0026, and 0029; and original claims 1, 3, 8, and 9 which form part of the specification.

vi. *restoring the gray scale of the one or more pixels using a halftone pattern comprising a matrix.*

Description: See, e.g., FIG. 1, reference nos. S106, S108, and S110; paragraphs 0005-0020 and 0027-0029; and original claims 1, 2, 4-8, and 10-13 which form part of the specification.

vii. *wherein a number of rows and a number of columns of the matrix correspond to the number of bits of gray scale image data reduced from the one or more pixels.*

Description: See, e.g., FIG. 1, reference no. S106; paragraphs 0005-0020 and 0027; and original claims 1, 4-6, 8, and 10-12 which form part of the specification.

viii. *wherein the gray scale is restored without reintroducing the image noise into the scanned image.*

Description: See, e.g., FIG. 1, reference nos. S108 and S110; paragraphs 0005-0020, 0028, and 0029; and original claims 1, 2, 4-8, and 10-13 which form part of the specification.

Claim 8

Features recited in claim 8:

i. *A method.*

Description: See, e.g., FIG. 1; paragraphs 0001, 0005, and 0024; and original claims 1-13, which form part of the specification.

ii. *scanning an image with a scanner to obtain a full image level of a color element of a pixel of the image.*

Description: See, e.g., FIG. 1, reference nos. 104 and S102; paragraphs 0005-0020, 0024, and 0025; and original claims 1 and 8, which form part of the specification.

iii. *reducing the full image level of the color element by decreasing a number of bits of the color element according to an image noise associated with the scanned image.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020 and 0026; and original claims 1, 3, 8, and 9 which form part of the specification.

iv. *wherein reducing the full image level causes the image noise to be substantially removed from the scanned image.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020, 0024, 0026, and 0029; and original claims 1, 3, 8, and 9 which form part of the specification.

v. *composing a halftone pattern comprising a reduced image level of the color element corresponding to the decreased number of bits.*

Description: See, e.g., FIG. 1, reference no. S106; paragraphs 0005-0020 and 0027; and original claims 1, 3, 8, and 9 which form part of the specification.

vi. *restoring the full image level of the color element of the pixel using the halftone pattern without reintroducing the image noise into the scanned image.*

Description: See, e.g., FIG. 1, reference nos. S108 and S110; paragraphs 0005-0020, 0028, and 0029; and original claims 1, 2, 4-8, and 10-13 which form part of the specification.

Claim 18

Features recited in claim 18:

i. *An apparatus.*

Description: See, e.g., FIG. 1, reference nos. 102 and 104; paragraphs 0004, 0022-0025, and 0030; and original claims 1-13, which form part of the specification.

ii. *means for scanning an image to obtain a full image level of a color element of one or more pixels of the image.*

Description: See, e.g., FIG. 1, reference nos. 104 and S102; paragraphs 0005-0020, 0024, and 0025; and original claims 1 and 8, which form part of the specification.

iii. *means for operating on the scanned image.*

Description: See, e.g., FIG. 1, reference nos. 102 and S102; paragraphs 0005-0020, 0024, and 0025; and original claims 1 and 8, which form part of the specification.

iv. *reducing the full image level by decreasing a number of bits of the color element from the one or more pixels.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020 and 0026; and original claims 1, 3, 8, and 9 which form part of the specification.

v. *wherein the number of bits corresponds approximately to an image noise associated with the scanned image.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020 and 0026; and original claims 1, 3, 8, and 9 which form part of the specification.

vi. *wherein reducing the full image level causes the image noise to be substantially removed from the scanned image.*

Description: See, e.g., FIG. 1, reference no. S104; paragraphs 0005-0020, 0024, 0026, and 0029; and original claims 1, 3, 8, and 9 which form part of the specification.

vii. *composing a halftone pattern comprising a reduced image level of the color element.*

Description: See, e.g., FIG. 1, reference no. S106; paragraphs 0005-0020 and 0027; and original claims 1, 3, 8, and 9 which form part of the specification.

viii. *wherein the reduced image level corresponds to the decreased number of bits.*

Description: See, e.g., FIG. 1, reference no. S106; paragraphs 0005-0020 and 0027; and original claims 1, 3, 8, and 9 which form part of the specification.

ix. *recombining an image level of the one or more pixels in the image using the halftone pattern without reintroducing the image noise into the scanned image.*

Description: See, e.g., FIG. 1, reference nos. S108 and S110; paragraphs 0005-0020, 0028, and 0029; and original claims 1, 2, 4-8, and 10-13 which form part of the specification.

VI. Grounds of Rejection to be Reviewed on Appeal under 37 CFR § 41.37(c)(1)(vi)

Whereas the rejection of all claims 1-4, 6-13, and 18-30 is appealed, Appellant chooses to address claim 1 with particularity; these comments apply equally to the remaining claims for similar reasons as provided herein.

Review of the rejection of claims 1-4, 6-13, and 18-30 under 35 U.S.C. § 103(a) over Hajjahmad et al. (U.S. Patent 5,748,770) in view of Accad (U.S. Patent 5,553,200) is requested on the following grounds:

Ground 1. The Examiner failed to indicate a proper motivation to combine.

Ground 2. Even if combined, the references fail to disclose the recited features.

Ground 3. No reasonable expectation of success.

VII. Argument under 37 CFR § 41.37(c)(1)(vii)

A. The Prior Art

The Examiner rejected claims 1-4, 6-13, and 18-30 under 35 U.S.C. § 103(a) over Hajjahmad et al. in view of Accad (U.S. Patent 5,553,200).

Hajjahmad is directed to image color recovery while "transforming data from the spatial domain to the frequency domain" (col. 2, lines 18-37).

The reference to Hajjahmad has been distinguished in the past four responses filed by Appellant.

Accad is directed to a method for providing bit-rate reduction and reconstruction of image data in which dither arrays are used to reduce the number of bits of the image data, and threshold arrays are used to perform de-dithering correction of the reconstructed image (col. 15 lines 18-35).

The Accad reference was first distinguished in the Appellant's response dated December 17, 2007 and subsequently reappeared in the Final Office Action, in which the Examiner determined to combine the Accad reference with the Hajjahmad reference. The Final Office Action dated August 24, 2011 is the sixth office action prepared by the Examiner since Appellant last filed a Request for Continued Examination on March 5, 2009.

B. Grounds for Review of the Rejection of Claims

No Prima Facie Case of Obviousness

The Examiner failed to meet the legal burden of establishing a prima facie case of obviousness under MPEP § 2142 at least for the reason that (1) the Examiner has not provided a proper suggestion or motivation to combine the references, (2) the combination of references does not teach or suggest all the claim elements, and (3) there is no reasonable expectation of success. While Appellant believes that the Examiner has failed to establish a prima facie case of obviousness for all three of the above reasons, it is respectfully requested that the rejection of the pending claims be reversed if any of Appellant's grounds for appeal are found persuasive.

Ground 1. No motivation to combine

By way of providing motivation to combine Accad with Hajjahmad, the Examiner stated that "It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Hajjahmad by the teaching of Accad to have improved reconstruction methods to incorporate into any bit-rate reduction techniques that uses dither arrays" (page 18 of the Final Office Action). Appellant respectfully disagrees.

As previously mentioned, Hajjahmad is directed to image color recovery while "transforming data from the spatial domain to the frequency domain" (col. 2, lines 18-37). According to Hajjahmad, "Spatial image data points may be transformed to the frequency domain using transformations such as Fourier transforms or discrete cosine transforms... (and that) discrete cosine transforms and inverse discrete cosine transforms (may be used) for image compression" (col. 2, lines 7-11).

In Accad's method for providing bit-rate reduction and reconstruction of image data, on the other hand, Accad describes that as "the contents of the frame buffer are scanned one line at a time by a raster reader... a lookup table is used to de-dither, dequantize and inversely transform the image information to produce N' bits per pixel per component of reconstructed image data" (col. 8, lines 13-19).

According to Accad, "One way of assuring both fast bit-rate reduction and fast reconstruction is to restrict the reduction techniques to those performed on a single pixel basis... excludes techniques that involve spatial processing" (col. 3, lines 60-64). Furthermore, according to Accad, "it is also desirable to perform bit-rate reduction on a single pixel basis, discarding any spatial compression" (col. 6, lines 47-49).

The teachings of Accad, related to bit-rate reduction and reconstruction, fail to provide any insight or guidance as to improving the transformation process from a spatial domain to a frequency domain, as disclosed in Hajjahmad. Rather, as described above, Accad appears to expressly teach away from the proposed combination. Accordingly, Appellant respectfully submits that the Examiner has failed to identify a proper basis for why one of ordinary skill in the art would be motivated to combine Hajjahmad with Accad.

Appellant further notes that the Examiner's reference to U.S. Patent No. 7,233,414 (page 18 of the Final Office Action) fails to provide any motivation to combine Hajjahmad and Accad since Okada was not relied upon for any of the grounds of rejection.

Ground 2. The claim elements are not taught by the proposed combination

In rejecting claim 1, the Examiner appears to acknowledge that Hajjahmad fails to disclose decreasing the full color level of the color element by reducing a number of bits of the full color level of the color element to form a reduced color level image, wherein the number of bits reduced from the full color level is dependent on an image noise associated with the scanned image, and wherein decreasing the full color level causes the image noise to be substantially removed from the scanned image, as recited by claim 1. Instead the Examiner alleged that Accad discloses these features (page 4 of the Final Office Action).

The Examiner noted at page 4 of the Final Office Action that "since the bit-rate reduction on a single pixel basis, discarding any spatial compression (noise) and each pixel using a dither array so that the image data is reduced to smaller number of bits (e.g., 4 or 2 bits per pixel. Thus the number of bits reduced from the full color level corresponds to an image noise level associated with scanning the image)." Appellant respectfully disagrees.

The Examiner appears to inexplicably equate the terms "spatial compression" with "noise." The term "spatial compression" refers to compression of image data in a spatial domain, as taught by Hajjahmad (col. 2, lines 7-11). Whereas Accad refers to "discarding any spatial compression," (Accad, col. 6, lines 47-49) this appears to be made with respect to bit-rate reduction that excludes "techniques that involve spatial processing" (Accad, col. 3, lines 60-64). The term "spatial compression" is not used by Accad as being some type of noise that is discarded, as seemingly alleged by the Examiner, but rather as a type or format of compression that may be discarded during a bit-rate reduction technique.

Appellant respectfully submits that the Examiner has interpreted the term "image noise" in a manner which is not consistent with the understanding according to one of ordinary skill in the art. Appellant's specification states that "When a scanner is used for scanning a document, image noise of the scanned image of the document is produced due the scanner devices" (page 2, lines 8-9).

In Accad, by contrast, the reference to "spatial compression" refers to a process of lossy image compression which occurs after the image is scanned, e.g., to remove spatial data that is not perceptible to the human eye. Appellant respectfully submits that the spatial data of Accad is not "image noise" in the first instance. Furthermore, Accad does not describe how this spatial data is discarded in any event.

Accad describes a further conventional method for using image bit reduction using pseudo-random noise; however, in this method a random quantity is first added and then removed (col. 5, lines 25-35). Accordingly, Accad's pseudo-random noise method also fails to disclose *composing a pattern comprising the number of bits reduced from the full color level of the color element... and restoring the full color level of the color element of the pixel by combining the reduced color level image with the pattern*, as recited by claim 1. If anything, Accad's random noise method teaches rather an opposite sequence of addition and subtraction.

Whereas the Examiner has acknowledged that Hajjahmad fails to disclose wherein decreasing the full color level causes the image noise to be substantially removed from the scanned image, as recited by claim 1 (page 3, final paragraph of the Final Office Action), the Examiner instead alleges that Hajjahmad discloses wherein the full color level of the color element is restored without reintroducing the image noise into the scanned image, as recited by claim 1 (page 3 of the Final Office Action). Based on the Examiner's acknowledgement of Hajjahmad and the Examiner's interpretation of noise in view of Accad, it is less than clear what the Examiner is referring to as "image noise" in this particular reference to Hajjahmad.

Rather, the Examiner noted that "since the processed pixels will exhibit full color resolution. Thus the color element is restored without reintroduced the image noise into the scanned image" (page 3 of the Final Office Action). Appellant respectfully submits that the restoration of the full color resolution of the processed pixels, as alleged by the Examiner, fails to provide any correlation to the reintroduction of image noise. Rather, the alleged relationship between color restoration and image noise appears to more or less be an attempt to characterize Appellant's own claim features, rather than providing a reference to Hajjahmad which may be used to support the present grounds of rejection.

Furthermore, Appellant respectfully submits that the Examiner has failed to provide a sufficient allegation as to which, if any, of the references discloses *composing a pattern comprising the number of bits reduced from the full color level of the color element*, as recited by claim 1. The Examiner's rejection of claim 1 is silent as to this element. Rather, the Examiner has alleged that Hajjahmad discloses "composing a pattern... comprising the color element" (pages 2 and 3 of the Final Office Action). The Examiner has also alleged that Accad discloses "decreasing the full color level of the color element by reducing a number of bits of the full color

level of the color element to form a reduced color level image" (page 4 of the Final Office Action).

Even assuming, arguendo, that the Examiner is correct in the above allegations, the Examiner has not provided sufficient support for the allegation that the combination discloses *composing a pattern comprising the number of bits reduced from the full color level of the color element*, as recited by claim 1. Rather, the Examiner appears to be parsing certain words of the claim rather than reading the features of the claim as a whole, that is, the Examiner has failed to read each element in consideration of the other elements in the claim. Appellant respectfully submits that the rejection of claim 1 is therefore improper, at least on the basis that the Examiner has failed to identify with particularity how, or if, the combination of references discloses all the recited elements.

Ground 3. No reasonable expectation of success

In rejecting claim 1, the Examiner cited Accad at column 8, lines 4-9, in arguing that "the transformed image data is then pixel-wise thresholded using a dither array so that the image data is reduced to a smaller number of bits per pixel per component" allegedly discloses decreasing the full color level of the color element by reducing a number of bits of the full color level of the color element to form a reduced color level image, as recited by claim 1 (page 4 of the Final Office Action).

As discussed above, Accad discloses "techniques that reduce the amount of frame buffer memory required" for printers (col. 2, lines 1-46) and "Halftoning by dithering (which) involves performing point by point comparisons of each pixel in the input image with the corresponding pixel in an equally sized comparison array" (col. 3, lines 10-14), while Hajjahmad discloses an image color recovery process while "transforming data from the spatial domain to the frequency domain" (col. 2, lines 18-37).

Even assuming, arguendo, that the combination of Accad with Hajjahmad is appropriate, Appellant respectfully submits that the bit-rate reduction and halftoning techniques, as taught by Accad, is sufficiently dissimilar to Hajjahmad's transformation process to render the proposed combination overly vague and indeterminate. For example, the Examiner has provided no explanation as to how the dither array disclosed by Accad could be applied to transforming data from the spatial domain to the frequency domain, as in Hajjahmad, even though the Examiner

himself has acknowledged that "the transformation may be different type" (page 2, lines 3-5 of the Advisory Action dated November 4, 2011). Appellant notes that Hajjahmad does not refer to either of a "dither array" or "threshold array" as disclosed by Accad. Rather, the Examiner appears to be arguing that the different type of arrays disclosed by Accad and Hajjahmad are irrelevant in combining the various features of one or the other reference together.

Appellant respectfully submits that such a liberal interpretation of the references is inconsistent with the different techniques disclosed by Accad, which relies on performing bit-rate reduction using "a pixel by pixel basis by stepwise calculations or by using LUTs" (Abstract), versus those of Hajjahmad which relies on "forward and inverse discrete cosine transforms" of the image data points and DCT coefficients, respectively (col. 4, lines 44-60).

Whereas both Hajjahmad and Accad relate to the compression of data, in one form or another, neither of these references disclose *wherein the number of bits reduced from the full color level is dependent on an image noise associated with the scanned image*, as recited by claim 1. Whether the compression is being performed by cosine transforms, or by bit-rate reduction, presumably both Hajjahmad and Accad would prefer to maximize the amount of data compression (e.g., Accad, col. 1, lines 55-67) rather than making the compression dependent on an amount of image noise. Furthermore, neither reference provides any suggestion or teaching that the disclosed methods of compression and/or transformation provide any reduction of image noise in the first instance, let alone *wherein decreasing the full color level causes the image noise to be substantially removed from the scanned image*, as recited by claim 1. Accordingly, Appellant respectfully submits that the proposed combination fails to provide any reasonable expectation of success with respect to the removal of image noise.

Although of different scope than claim 1, independent claims 6, 8, and 18 recite certain elements similar to those discussed above in claim 1, such that the comments directed to claim 1 also apply to claims 6, 8, and 18. As claims 2-4, 6, 7, 9-13, and 19-30 depend directly or indirectly from independent claims 1, 6, 8, and 18, the comments and revisions directed above to claims 1, 6, 8, or 18 apply equally to claims 2-4, 6, 7, 9-13, and 19-30, respectively. In addition, claims 2-4, 6, 7, 9-13, and 19-30 recite further subject matter. Accordingly, reconsideration and withdrawal of the rejection of claims 1-4, 6-13, and 18-30 is respectfully requested.

VIII. Claims Appendix under 37 CFR § 41.37(C)(1)(viii)

The text of the claims on Appeal, namely claims 1-4, 6-13, and 18-30, is attached hereto as an appendix, entitled Claims Appendix.

IX. Evidence Appendix under 37 CFR § 41.37(c)(1)(ix)

None.

X. Related Proceedings Appendix under 37 CFR § 41.37(c)(1)(x)

None.

CONCLUSION

The Appellant requests favorable consideration by the Board. If any questions remain, please call the undersigned at (503) 546-1812.

Customer No. 73552

Respectfully submitted,

STOLOWITZ FORD COWGER LLP

Bryan Kirkpatrick

Bryan D. Kirkpatrick
Registration No. 53,135

STOLOWITZ FORD COWGER LLP
621 SW Morrison Street, Suite 600
Portland, OR 97205
Telephone: 503-224-2170
Fax: 503-224-2084
Email: docket@stofoco.com

CLAIMS APPENDIX

1. (Previously Presented) A method, comprising:

scanning an image with a scanner to obtain a full color level of a color element of a pixel of the scanned image;

decreasing the full color level of the color element by reducing a number of bits of the full color level of the color element to form a reduced color level image, wherein the number of bits reduced from the full color level is dependent on an image noise associated with the scanned image, and wherein decreasing the full color level causes the image noise to be substantially removed from the scanned image;

composing a pattern comprising the number of bits reduced from the full color level of the color element, wherein the pattern has less color level of the color element than the full color level; and

restoring the full color level of the color element of the pixel by combining the reduced color level image with the pattern, wherein the full color level of the color element is restored without reintroducing the image noise into the scanned image.

2. (Previously Presented) The method of claim 1, wherein the reduced color level image and the pattern are combined using a bit-enhanced method.

3. (Previously Presented) The method of claim 1, wherein combining the reduced color level image with the pattern restores the pixel to include a same number of bits of the color element as before the full color level was decreased.

4. (Previously Presented) The method of claim 1, wherein the pattern comprises a halftone pattern.

5. (Cancelled)

6. (Previously Presented) A method, comprising:

scanning an image with a scanner to obtain a gray scale of one or more pixels of the image;

reducing the gray scale of the one or more pixels of the scanned image by reducing a number of bits of gray scale image data from each of the one or more pixels, wherein the number of bits of gray scale image data reduced from the one or more pixels is determined based, at least in part, on an image noise associated with the scanned image, and wherein reducing the gray scale causes the image noise to be substantially removed from the scanned image; and

restoring the gray scale of the one or more pixels using a halftone pattern comprising a matrix, wherein a number of rows and a number of columns of the matrix correspond to the number of bits of gray scale image data reduced from the one or more pixels, and wherein the gray scale is restored without reintroducing the image noise into the scanned image.

7. (Previously Presented) The method of claim 1, wherein the color level of the pattern depends on the number of bits reduced from the full color level.

8. (Previously Presented) A method, comprising:

scanning an image with a scanner to obtain a full image level of a color element of a pixel of the image;

reducing the full image level of the color element by decreasing a number of bits of the color element according to an image noise associated with the scanned image, wherein reducing the full image level causes the image noise to be substantially removed from the scanned image;

composing a halftone pattern comprising a reduced image level of the color element corresponding to the decreased number of bits; and

restoring the full image level of the color element of the pixel using the halftone pattern without reintroducing the image noise into the scanned image.

9. (Previously Presented) The method of claim 8, wherein the full image level of the color element in the restored image level comprises a same number of bits of the color element obtained by scanning the image.

10. (Previously Presented) The method of claim 8, wherein the halftone pattern comprises a matrix having a number of rows equal to the decreased number of bits.

11. (Previously Presented) The method of claim 10, wherein the matrix further comprises a number of columns equal to the decreased number of bits.

12. (Previously Presented) The method of claim 8, further comprising displaying the scanned image including the restored image level on a computer monitor.

13. (Previously Presented) The method of claim 8, further comprising filling out missing codes of the pixel using a bit-enhanced method.

14–17. (Cancelled)

18. (Previously Presented) An apparatus, comprising:

means for scanning an image to obtain a full image level of a color element of one or more pixels of the image; and

means for operating on the scanned image, wherein said operating comprises:

reducing the full image level by decreasing a number of bits of the color element from the one or more pixels, wherein the number of bits corresponds approximately to an image noise associated with the scanned image, and wherein reducing the full image level causes the image noise to be substantially removed from the scanned image;

composing a halftone pattern comprising a reduced image level of the color element, wherein the reduced image level corresponds to the decreased number of bits; and

recombining an image level of the one or more pixels in the image using the halftone pattern without reintroducing the image noise into the scanned image.

19. (Previously Presented) The apparatus of claim 18, wherein the color element in the recombined image level comprises a same number of bits of the color element as in the full image level.

20. (Previously Presented) The apparatus of claim 18, wherein the halftone pattern comprises a matrix having a number of rows and columns equal to the decreased number of bits.

21. (Previously Presented) The apparatus of claim 18, wherein the image level is recombined with the halftone pattern to restore the color element of the one or more pixels to the full image level.

22. (Previously Presented) The apparatus of claim 18, wherein the number of bits decreased from the full image level approximates a level of the image noise.

23. (Previously Presented) The apparatus of claim 18, wherein the reduced image level of the pattern corresponds with the number of bits reduced from the full image level.

24. (Previously Presented) The apparatus of claim 18, wherein one or more of the full image level, the reduced image level, and the image level comprise a color level.

25. (Previously Presented) The apparatus of claim 18, wherein one or more of the full image level, the reduced image level, and the image level comprise a gray level.

26. (Previously Presented) The method of claim 1, wherein the scanned image comprises three color elements, and wherein the pixel comprises at least one of the three color elements.

27. (Previously Presented) The method of claim 26, wherein the three color elements comprise a red color element, a blue color element, and a green color element.

28. (Previously Presented) The method of claim 9, wherein the full image level of the color element and the restored image level of the color element comprises a gray level.

29. (Presently Presented) The method of claim 28, wherein the full image level is reduced by decreasing a number of bits of the gray level.

30. (Previously Presented) The method of claim 8, wherein the number of bits of the color element decreased from the full image level is dependent on a level of the image noise.